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n/y/a 09/806243

INTERNATIONAL APPLICATION NO.

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PRIORITY DATE CLAIMED

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TITLE OF INVENTION

LUMPY PRODUCT IN ANIMAL FOOD COMPOSITIONS AND PROCESS FOR THE PRODUCTION THEREOF

APPLICANT(S) FOR DO/EO/US

SCHLEBUSCH et al. *Souannes*

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☐ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. ☒ Other items or information:

2 sheets of drawings

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JC03/Rec'd PCT/PTO 26 MAR 2001

LUMPY PRODUCT IN ANIMAL FOOD COMPOSITIONS
AND PROCESS FOR THE PRODUCTION THEREOF

BACKGROUND OF THE INVENTION

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The present invention relates to a lumpy product in animal food compositions and to a process for the production thereof.

Although nowadays there are numerous different animal foods in varied forms, they can be subdivided into two groups; on the one hand conventional instant animal foods, comprising a solid and a liquid phase, i.e. generally pieces of meat and a sauce or gravy around said pieces; and dry foods, in the form of specially shaped pellets, which result from a strong water abstraction, e.g. complete baking of a semifluid paste.

It has been found that in the case of instant animal food consisting of pieces of meat and gravy, the solid constituents of the food can easily stick to the teeth of the animal and consequently contribute to a much worse oral hygiene. In addition, due to the pasty or very soft consistency of the food the latter, instead of being chewed, is swallowed. No adequate comminution of the food takes place in the mouth, so that digestion is transferred to the gastrointestinal tract. As a result of an increased eating rate and the gulping of the food by the animal, no adequate salivation occurs and consequently the mouth is inadequately cleaned with respect to bacteria.

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Dry foods must be mechanically comminuted in chewing-intensive manner, so that as a result of chewing dental plaque is reduced and the gums have a better blood flow. Compared with moist foods, dry foods are not eaten as readily and can even be refused by the animal.

Tests have been carried out for the production of a lumpy animal food without using meat lumps. Thus, DE 2 728 512 A1 and DE 2 650 800 A1 disclose a wet food for pets, which has as a constituent heat-stable, meat-like blood-based lumps and provide a formulation for the lumps which is characterized by the presence of blood constituents and rubber. In both documents the strength of the lumps is determined by the addition of a given rubber quantity. Optionally, as a further ingredient, use can be made of an additional protein source, which can comprise animal or vegetable protein or mixtures thereof. However, the strength is solely determined by the addition of a suitable rubber. A graded setting of the strength and texture of the lump is not possible.

An object of the invention is to combine the positive aspects of the two animal food types, i.e. the health-encouraging aspect of dry food with the comparatively higher consumption attractiveness of the two-component instant food.

A further object of the invention is to provide a chunk in which the texture and strength can be adjusted in a graded manner, together with a process for the production thereof.

SUMMARY OF THE INVENTION

According to the invention, these objects are achieved by a lumpy product or chunk, which is suitable for admixing in or as the sole constituent of animal food compositions and which contain proteins, one or more water-binding components, water and salt, characterized in that it comprises at least one phase, in which the proteins, as a result of a suitable denaturing stage, form a matrix characterized by high strength and which is able to withstand processes such as sterilization and storage for several years without significant losses and further characterized in that the proteins come from concentrated blood plasma and/or blood plasma powder and/or egg albumin powder and/or wheat

gluten and/or soybean proteins. Additionally, the water-binding components are either obtained from the group flour/starch/waxy maize starch or the group silica/physiologically unobjectionable metal oxides/other atoxic inerts, water-absorbing substances or the group cellulose powder/plant fibers or a combination of substances from the different groups. The texture of the chunk is defined solely through the choice of the nature and quantity of the proteins and water-binding components.

It has been found that such a lump product, hereinafter called chunk for short, has a much greater strength than conventional meat pieces in a two-component instant food, so that the animals are forced to intensively chew the food, which leads to a reduction of dental plaque and a chunk according to the invention is gladly consumed by animals. Simultaneously through the planned choice of ingredients, it is possible to vary and adjust the texture of the chunks from brittle to elastic in accordance with individual needs or the planned use of the animal food. The ingestion of the chunks according to the invention takes place as a result of intensive chewing instead of gulping and for animals would appear to be more interesting than the consumption of conventional animal foods.

For solving the set problem importance is attached to the particular choice of functional proteins, alone or combined with other constituents having a cereal base, e.g. wheat flour, in order to obtain the desired texture characteristics. The desired texture results from the fact that the specifically chosen combination of proteins is coagulated, the released water is absorbed by the wheat flour, which is thereby made into a paste. Optionally a further water-binding component can be added, whose choice with regards to nature and quantity also has a decisive influence on the texture of the chunk. Thus, a chunk is provided, whose texture can be adjusted according to needs.

In order to ensure an increased strength of the protein matrix, it is in particular provided that the

fat/oil proportion in the solid phase of the chunks according to the invention represent below 5% and preferably below 2%. The proteins of the chunks emanate from concentrated blood plasma and/or blood plasma powder and/or egg albumin powder and/or wheat gluten and/or soy proteins.

A preferred embodiment is characterized in that the water-binding components come either from the group of flour/starch/waxy corn starch or the group of silicas/physiologically unobjectionable metal oxides/other non-toxic inerts, water-absorbing substances or the group of cellulose powder/vegetable fibers or a combination of substances from the different groups.

For the production of the chunks according to the invention, it is in particular provided that the weight ratio of the protein-containing ingredients to the water-binding components is in the range 2.5:1 to 0.3:1. In a preferred embodiment, the weight ratio is 2:1. In another embodiment, the weight ratio is 0.48:1.

It is in particular provided that following the production of the chunks, the content of proteins represents 10 to 35 wt.%, of flour/starch/waxy corn starch 15 to 40 wt.% and of silicas/physiologically unobjectionable metal oxides/other non-toxic inerts, water-absorbing substances or cellulose powder/vegetable fibers 5 to 25 wt.%.

Following production, preferably the ratio of proteins to flour is between 0.6 and 1.4, the moisture content being between 35 and 65%, the carbohydrate content between 10 and 30% and the fat proportion below 5%, preferably below 2%.

In another preferred embodiment, the chunks comprise an inner and an outer phase, the outer phase containing the high strength protein matrix which is at least 10 and preferably at least 18 times more resistant to deformation than the inner phase. The inner phase is formed from cooked or

uncooked meat fractions.

In another preferred embodiment, the chunks comprise an inner and an outer phase, the inner phase containing the high strength protein matrix and is at least 10 and preferably 18 times more resistant to deformation than the outer phase, which is an emulsion or a gel or has a soft, easily deformable consistency.

It is stressed that the limitation of the description to chunks comprising only two phases is not to be understood as a restriction. In fact, the invention also covers chunks with three, four or more phases, which differ as regards their strength.

The invention also relates to a process for the production of a lumpy product or chunk, in which for the production of the high strength phase, the proteins are dissolved in water. The water-binding substances are then dispersed in the protein solution. The viscosity of the thus obtained suspension is adjusted by an appropriate addition of swellable or water-absorbing substances. The obtained phase is shaped into strands of a clearly defined size. The obtained strands undergo a denaturing stage and are then cut to an appropriate size and are packed and sterilized alone or, optionally, with other components. Further, the texture of the chunk is solely determined by the choice of the nature and quantity of the proteins and the water-binding component. The proteins are preferably dissolved in water, accompanied by the addition of salt. According to the invention, it is also preferred that the water-binding substances, which are dispersed in the protein/salt solution, belong to the flour/starch/waxy corn starch group.

For the purpose of adjusting the viscosity of the suspension, use is preferably made of one or more substances from the group flour/silica/physiologically unobjectionable metal oxides/other non-

toxic, inert water-absorbing substances/cellulose powder/vegetable fibers.

According to a preferred embodiment of the invention, the shaped strands have an average diameter of 10 to 35 mm.

It is particularly preferable for the process according to the invention, that the denaturing stage involves a temperature change or a pH-value change. In a preferred embodiment of the invention, the temperature is raised to at least 85° C for carrying out the denaturing stage.

Preferably, following the cutting stage, the chunks obtained have a size suitable for consumption.

The invention is described in greater detail hereinafter relative to the following examples and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-section through a nozzle for producing a two-phase chunk and the diagrammatic representation of a two-phase chunk following production.

Fig. 2 is the representation of the force required for breaking open the two phases in a two-phase chunk.

Example 1

Formulations and analytical results of the solid phase of a chunk according to the invention

In order to determine the influence of different ingredients on the biting consistency and texture, experiments were carried out with different formulation compositions according to Table 1. It has been found that in particular the absence of silica or the presence of wheat gluten or cellulose powder led to a produced chunk having an elastic consistency. The brittle chunks produced with silica only differed

slightly from the analytical standpoint from the elastic chunks produced without silica, as can be gathered from Table 2. Elastic chunk 3 has the lowest moisture content.

Table 1: Formulations for the solid phase of an inventive chunk (values in wt.%)

| Formulation No. | 1 | 2 | 3 | 4 | 5 |
|--------------------|---------|---------|---------|---------|---------|
| Silica | 10.5 | 13 | — | 11 | — |
| Conc. Blood plasma | 67 | — | — | — | — |
| Albumin powder | — | 18 | 26 | 17.5 | 17.5 |
| Wheat flour | 22 | 25 | 25 | 25 | 25 |
| Wheat gluten | — | — | 8.5 | — | — |
| Cellulose powder | — | — | — | — | 11 |
| Salt | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Water | — | 43.5 | 40 | 46 | 46 |
| Total | 100 | 100 | 100 | 100 | 100 |
| Texture | brittle | brittle | elastic | brittle | elastic |

Table 2: Analytical results of the chunks produced according to Table 1 (values in wt.%)

| Product | 1 | 2 | 3 | 4 | 5 |
|---------------|-----|-----|-----|-----|-----|
| Moisture | 54 | 48 | 45 | 50 | 50 |
| Protein | 15 | 18 | 32 | 18 | 18 |
| Fat | 0.6 | 0.8 | 1.3 | 0.8 | 0.8 |
| Carbohydrates | 14 | 17 | 17 | 17 | 17 |

Example 2

Production of chunks having brittle characteristics

The mixed, dry formulation components of formulation 1 are continuously dosed into a suitable

mixer and mixed there with a corresponding amount of water. The viscous paste is shaped by means of nozzles on a steam tunnel to strands and completely baked. The chunks are cut and sterilized in cans.

Example 3

Production of chunks characterized by elastic characteristics

5 The mixed, dry formulation components of formulation 3 are continuously dosed in a double-shaft mixer and mixed there with a corresponding amount of water. The viscous phase is shaped by means of nozzles on a steam tunnel to strands and completely baked. The chunks are cut and sterilized in cans.

Example 4

Production of a two-phase chunk with an outer, solid and an inner, soft phase

 The ingredients of formulation 3 are mixed in the following way. Firstly, the albumin powder is dissolved, accompanied by the addition of salt in an apparatus and then the wheat flour and wheat gluten are incorporated into the suspension. Phase A obtained is pumped into the outer tube 1 of a nozzle, which is constructed from two concentrically arranged tubes of different diameters (28 and 16 mm). A conventional phase B, i.e. comprising cooked meat pieces, is pumped through the inner tube 2. The concentric double strand is baked in a steam tunnel and then cut up.

Example 5

Analytical results of a two-phase chunk following sterilization

 The chunks produced according to example 4 were analyzed in phase-specific manner and the results summarized in table 3 were obtained.

Table 3: Analytical results in a two-phase chunk after sterilization

| | Solid phase [%] | Soft phase [%] |
|-----------|-----------------|----------------|
| Moisture | 65.3 | 67.6 |
| Protein | 14.5 | 9.9 |
| 5 Fat/Oil | 0.3 | 9.5 |
| Ash | 9.3 | 2.6 |

Fig. 1 is a cross-section through a nozzle for the production of two-phase chunks. An outer tube 1 and an inner tube 2 with different diameters are arranged concentrically and two different phases A and B are pumped through the outer/inner tubes. This leads to an approximately tubular strand, comprising a core phase and a covering phase. The resulting strand is fixed by heat action on a steam tunnel/gas oven and then cut to chunks C of the correct size.

Fig. 2 represents the force required for the breaking open of the two phases in a two-phase chunk. Deformation takes place by means of a mortar or ram and the force is given in Newtons as a function of the deformation path in mm. The two different phase strengths corresponding to the two-stage deformation of the chunks can be seen.

The features of the invention given in the description, claims, tables and drawings can be used to implement the different embodiments of the invention, both singly and in random combination.

CLAIMS

1. A chunk suitable for admixing to, or as the sole constituent of, animal food compositions containing proteins, one or more water-binding components, water and salt comprising at least one phase, in which the proteins are formed of a high strength matrix as a result of a denaturing stage, said matrix being able to withstand processes such as sterilization and storage for several years without any significant strength losses and wherein said proteins are selected from the group consisting of concentrated blood plasma, blood plasma powder, egg albumin powder or either selected from the group consisting of wheat gluten, soybean proteins, and wherein said water-binding components are either selected from the group consisting of flour, starch, waxy maize starch or the group consisting of silica, physiologically unobjectionable metal oxides, other atoxic inerts, water-absorbing substances, cellulose powder, plant fibers, a combination of substances from the different groups and that define the texture of the chunk solely through the choice of the nature and quantity of the proteins and water-binding components.
2. A chunk according to claim 1, wherein the solid phase has a fat/oil proportion below 5%.
3. A chunk according to claim 2, wherein the solid phase has a fat/oil proportion below 2%.
4. A chunk according to claim 1 wherein the weight ratio of the protein-containing ingredients to the water-binding components is in the range 2.5:1 to 0.3:1.
5. A chunk according to claim 1 wherein following the production thereof, the content of proteins is 10 to 35 wt.%, of flour, starch, waxy maize starch, 15 to 40 wt.% of silicas, physiologically unobjectionable metal oxides, other atoxic inerts, water-absorbing substances and 5 to 25 wt.% of cellulose powder/vegetable fibers.

CLAIMS

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1. A chunk suitable for admixing to, or as the sole constituent of, animal food compositions containing proteins, one or more water-binding components, water and salt comprising at least one phase, in which the proteins are formed
5 of a high strength matrix as a result of a denaturing stage, said matrix being able to withstand processes such as sterilization and storage for several years without any significant strength losses and wherein said proteins are selected from the group consisting of concentrated blood plasma, blood plasma powder, egg albumin powder or either selected from the group consisting of
10 wheat gluten, soybean proteins, and wherein said water-binding components are either selected from the group consisting of flour, starch, waxy maize starch or the group consisting of silica, physiologically unobjectionable metal oxides, other atoxic inerts, water-absorbing substances, cellulose powder, plant fibers, a combination of substances from the different groups and that
15 define the texture of the chunk solely through the choice of the nature and quantity of the proteins and water-binding components.
 2. A chunk according to claim 1, wherein the solid phase has a fat/oil proportion below 5%.
 3. A chunk according to claim 2, wherein the solid phase has a fat/oil proportion below 2%.
 4. A chunk according to claim 1 wherein the weight ratio of the protein-containing ingredients to the water-binding components is in the range 2.5:1 to 0.3:1.
 5. A chunk according to claim 1 wherein following the production thereof, the content of proteins is 10 to 35 wt.%, of flour, starch, waxy maize starch, 15 to 40 wt.% of silicas, physiologically unobjectionable metal oxides, other atoxic

- inerts, water-absorbing substances and 5 to 25 wt.% of cellulose
5 powder/vegetable fibers.
6. A chunk according to claim 5 wherein following its production, the ratio of proteins to flour is between 0.6 and 1.4.
7. A chunk according to claim 5 wherein following the production thereof, the moisture content is between 35 and 65%, the carbohydrate content between 10
5 and 30% and the fat proportion below 5%.
8. A chunk according to claim 5 wherein following its production, the fat proportion is below 2%.
9. A chunk according to claims 1, 2, 3, 4, 5, 6, 7 and 8 wherein said chunk comprises an inner and an outer phase said outer phase being at least 10 and preferably 18 times more deformation-resistant than the inner phase.
10. A chunk according to claims 1, 2, 3, 4, 5, 6, 7, or 8 wherein said chunk comprises an inner and an outer phase and wherein said inner phase is a phase comprising cooked or uncooked meat pieces.
11. A chunk according to one of the claims 1, 2, 3, 4, 5, 6, 7, or 8, characterized in that it comprises an inner and an outer phase, the inner phase having a composition according to one of the claims 1, 2, 3, 4, 5, 6, 7, or 8 and is at least 10 and preferably 18 times more deformation-resistant than the outer
5 phase.
12. A chunk according to claim 1 wherein said chunk comprises an inner and an outer phase and wherein said outer phase is an emulsion or a gel or has a soft, easily deformed consistency.
13. A process for the production of a chunk containing proteins wherein the proteins are dissolved in water, water-binding substances are then dispersed in the protein solution, the viscosity of the resulting suspension is adjusted by an

5 appropriate addition of swellable or water-absorbing substances, the resulting phase is shaped to strands having a clearly defined size, the resulting strands are denatured and are then cut to a suitable size and are packed and sterilized alone or optionally with other components and wherein the texture of the chunk is determined solely by the choice of the nature and quantity of the proteins and the water-binding component.

14. A process according to claim 13 wherein the proteins are dissolved in water, accompanied by the addition of salt.
15. A process according to claim 13 wherein the water-binding substances dispersed in the protein/salt solution are selected from the group consisting of flour, starch, or waxy maize starch group.
- 5 16. A process according to claim 12 wherein the viscosity of the suspension is adjusted by the addition of one or more substances selected from the group consisting of flour, silica, physiologically unobjectionable metal oxides, other atoxic inert, water-absorbing substances, cellulose powder, or vegetable fibers.
17. A process according to claim 12 wherein the shaped strands have an average diameter of 10 to 35 mm.
18. A process according to claim 12 wherein the denaturing stage involves a temperature change or a pH-value change.
19. A process according to claim 7 wherein the temperature is raised to at least 85°C for performing the denaturing state.
20. A process according to claim 12 wherein the pieces obtained following the cutting stage have a size appropriate for consumption.

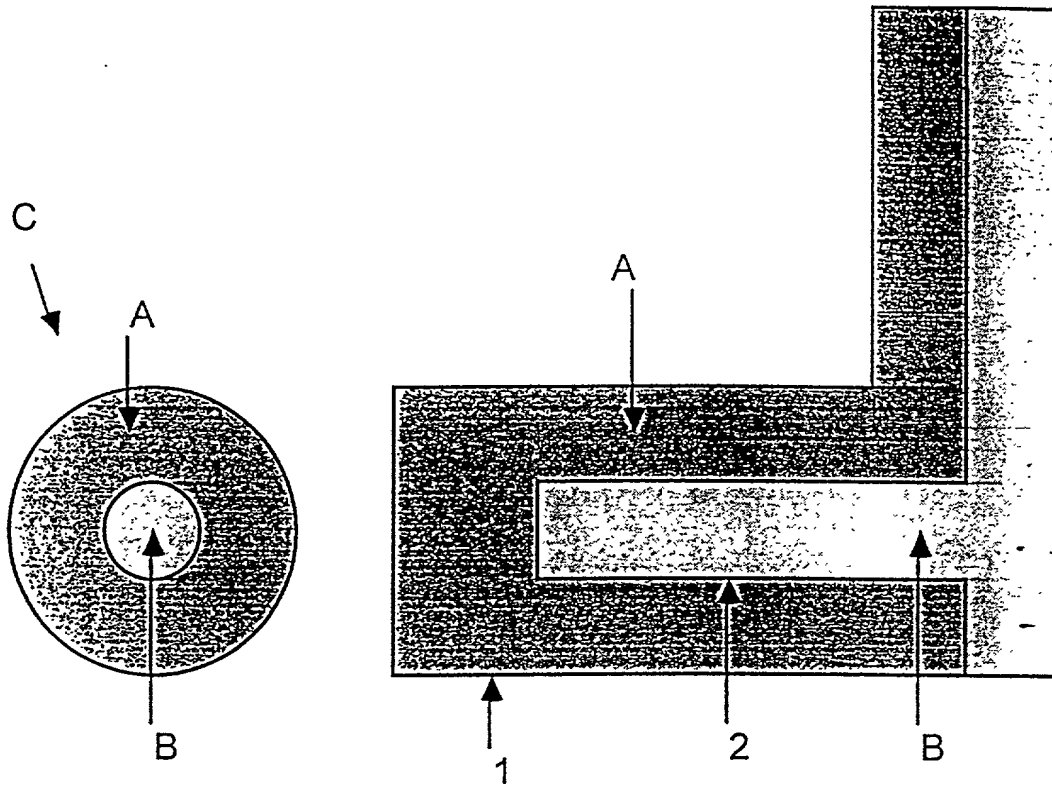


Fig. 1

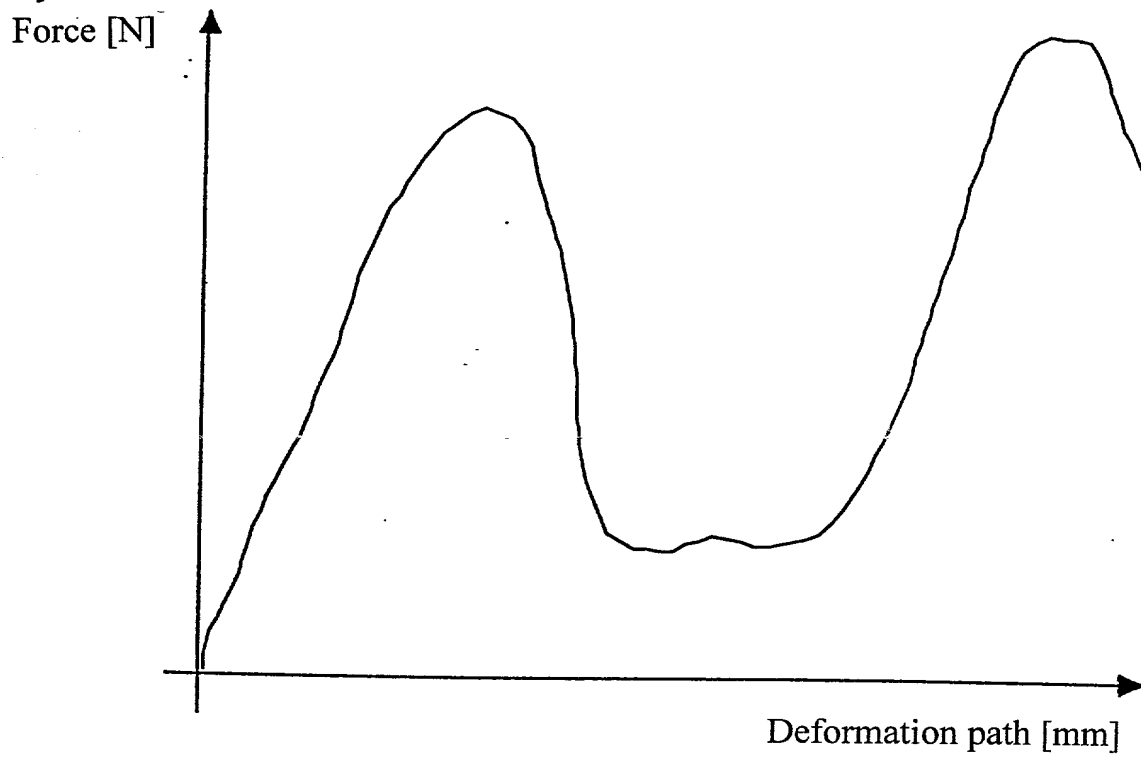


Fig. 2

Docket No.

10035.00

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

LUMPY PRODUCT IN ANIMAL FOOD COMPOSITIONS AND PROCESS FOR THE PRODUCTION THEREOF ✓

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on March 26, 2001 ✓ as United States Application No. or PCT International Application Number 09/806,243 ✓ and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

| Prior Foreign Application(s) | Priority Not Claimed |
|---|-------------------------------|
| <u>19844393.5</u> ✓ (Number) | <u>Germany</u> ✓ (Country) |
| <u>09/28/98</u> ✓ (Day/Month/Year Filed) | <input type="checkbox"/> |
| _____ (Number) | _____ (Country) |
| _____ (Day/Month/Year Filed) | <input type="checkbox"/> |
| _____ (Number) | _____ (Country) |
| _____ (Day/Month/Year Filed) | <input type="checkbox"/> |

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

PCT/DE99/03125

09/28/99

Pending

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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Sole or first inventor's signature

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Full name of second inventor, if any

Siegfried Schmidt

Second inventor's signature

Siegfried Schmidt Date 11-05-2001

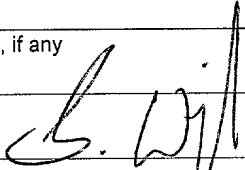
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Citizenship

German ✓

Post Office Address

3-00
Full name of third inventor, if anySiegfried WaigandThird inventor's signature 

Date

18.05.2001

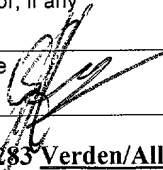
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Citizenship

German ✓

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Full name of fifth inventor, if any

Fifth inventor's signature

Date

Residence

Citizenship

Post Office Address

Full name of sixth inventor, if any

Sixth inventor's signature

Date

Residence

Citizenship

Post Office Address

Form PTO-SB-01 (6-95) (Modified)